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OPERATIONS DESERT SHIELD AND DESERT STORM ARE GENERALLY CONSIDERED TO HAVE BEEN LOGISTICS TRIUMPSH. SUSTAINMENT SUPPORT OF HIGH PRIORITY MATERIAL THAT REQUIRES AIR TRANSPORT, HOWEVER, HAS BEEN CRITICIZED. SUSTAINMENT AIRLIFT REQUIRED FOR THE ENORMOUS AMOUNTS OF HIGH PRIORITY MATERIAL GENERATED FOR SUPPORT OF DEPLOYED FORCES WAS EITHER NOT FORESEEN OR SEVERELY UNDERESTIMATED TO SUPPORT MATERIAL AND LIFT REQUIREMENTS. THE IMMEDIATE RESULTS WERE MATERIAL SHORTAGES, TRANSPORTATION DELAYS, AND THE IMPOSITION OF AD HOC SYSTEMS TO SUPPORT SUSTAINMENT OPERATIONS. THIS PAPER EXAMINES MANY OF THE AIR SUSTAINMENT LESSONS LEARNED FROM THE GULF WAR. FOCUS IS ON THE HIGH PRIORITY MATERIAL REQUIREMENTS SO VITAL TO THE OPERATIONAL READINESS OF DEPLOYED FORCES. FLEXIBLE AIRLIFT OPTIONS, BOTH MILITARY AND COMMERCIAL, ARE REVIEWED. INCLUDED ARE LESSONS LEARNED WITH REGARD TO SUSTAINMENT PLANNING AND COMMAND AND CONTROL OF SUSTAINMENT OPERATIONS. IN EACH CASE, DISCUSSION IS TAILORED TO PLANNING ACTIONS THAT OPERATIONAL LEVEL COMMANDERS AND THEIR LOGISTICS STAFFS CAN TAKE TO BRING ABOUT MORE EFFECTIVE OUT-COMES FOR AIR SUSTAINMENT OPERATIONS.

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AIR SUSTAINMENT OF MILITARY OPERATIONS

Practical Problems & Prospects

by

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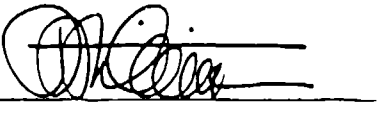
A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: 

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Abstract of

AIR SUSTAINMENT OF MILITARY OPERATIONS
PRACTICAL PROBLEMS & PROSPECTS

Operations Desert Shield and Desert Storm are generally considered to have been logistics triumphs. Sustainment support of high priority material that requires air transport, however, has been criticized. Sustainment airlift required for the enormous amounts of high priority material generated for support of deployed forces was either not foreseen or severely underestimated to support material and lift requirements. The immediate results were material shortages, transportation delays, and the imposition of ad hoc systems to support sustainment operations. This paper examines many of the air sustainment lessons learned from the Gulf War. Focus is on the high priority material requirements so vital to the operational readiness of deployed forces. Flexible airlift options, both military and commercial, are reviewed. Included are lessons learned with regard to sustainment planning and command and control of sustainment operations. In each case, discussion is tailored to planning actions that operational level commanders and their logistics staffs can take to bring about more effective outcomes for air sustainment operations.

PREFACE

The proverb goes, "If we stand on the shoulders of giants, we may see further than the giants themselves."[1] It is from this premise that the paper proceeds. While Operations Desert Shield and Desert Storm were great successes, including from a logistics standpoint, it was not always a result of effective pre-planning and use of established procedures. On the contrary, many aspects of the logistics support - and in particular, those pertaining to high priority cargo sustainment issues - were not done 'by the book' and often were in reaction to an evolving or evolved problem. While it is unlikely that we will soon see a repeat of the Desert Shield/Desert Storm scenario, tasking for small operations and non-traditional contingencies stands the likelihood of increasing. It is therefore important to learn from these logistic giants - repeating the good while avoiding the not so good. Sustainment lessons learned from Desert Shield/Desert Storm and some other recent military exercises and operations thus constitute the primary sources for this paper. While it remains to be seen which lessons learned will be truly enduring, all should be considered in preparing plans for future operations. As a number of high priority cargo and sustainment issues are addressed, it is intended not as an authoritative work on air sustainment of military operations, but as a launching point for further study in air sustainment concerns for the operational commander.

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DEFINITIONS

Sustainability is the ability to maintain logistic support throughout the operation. The principle of sustainability focuses the supporting commander's attention on the long-term objectives and requirements of the supported forces. Long-term support is the greatest challenge of the logistician, who must not only attain the minimum essential material levels to initiate combat operations (readiness) but must also sustain those operations (sustainability). The logistician must plan for and achieve logistic momentum. Sustainability demands frugality and conservation. Waste of supplies or services ultimately will create shortages that could jeopardize continued operations. Sustainability requires some degree of redundancy. It demands reliance on alternatives when the inevitable shortfalls occur...Having the logistics support needed to start an operation is not enough; that support must be sustained throughout the operation.

- Joint Pub 4-0[2]

Sustainability - The ability to maintain the necessary level and duration of operational activity to achieve military objectives. Sustainability is a function of providing for and maintaining those levels of ready forces, material, and consumables necessary to support military effort.

- Joint Pub 1-02[3]

AIR SUSTAINMENT OF MILITARY OPERATIONS
PRACTICAL PROBLEMS & PROSPECTS

CHAPTER I

INTRODUCTION

> ...increased demand for parts must be recognized at the commencement of high tempo operations...urgently needed parts for repairs [were] delayed...critical cargo exceeded the sustainment allocation... significant turmoil in load planning...inaccurate schedules for strategic lift...the concept of operations per JOPES TPFDDs understates LOGAIR requirements...manifesting in JOPES is problematic... WWMCCS data was, at best, 25% accurate...procedures for emergent logistics requirements not specified... make early establishment of a 'Desert Express' type service an integral part of [the] CINC and TRANSCOM OPLAN...alternate sources must be explored...[1]
>
> - Desert Shield/Desert Storm Lessons Learned

Lessons Learned

These are some of a great many comments from various military lessons learned data bases that discuss the logistics problems encountered in supporting Operations Desert Shield and Desert Storm and other military exercises and operations. Yet Desert Shield/Desert Storm is considered a major logistics triumph. What, then, accounts for these criticisms?

The answer can be found in issues of sustainability, particularly in planning and in operational employment. The full spectrum of sustainment concerns for the forces deployed in Operations Desert Shield and Desert Storm were not fully covered during the contingency planning process while what was planned often seriously understated sustainment needs. The results were material shortages, transportation delays, and the imposition of ad hoc systems to logistically support operations. It is

therefore important to adjust future operational planning to account for these problems. At the same time some of the ad hoc systems turned out, at least in part, to be quite successful and so should be considered for use in future operations.

Outline

The subject of this paper is the movement of high priority sustainment cargo to theater forces via airlift. It will focus on two areas:

- High Priority Material Movement, and
- Air Sustainment Command, Control, and Planning.

In both cases, sustainment lessons learned, principally from Operations Desert Shield and Desert Storm, are used as the foundation for discussion.

High priority cargo, a relatively small amount of material in terms of the total spectrum of cargo movement requirements,[5] particularly during the deployment phase, is nevertheless of critical importance to the operational commander. High priority cargo consisting largely of repair parts and other crucial supplies most directly translate into the high equipment and personnel readiness so crucial to commence or continue combat operations. The scope of the high priority material requirement and its relation to air transport is the topic of Chapter II. Included in Chapter II is a look at airlift, the key to moving high priority cargo throughout the duration of a military operation.

> Airlift, as expected, bore the brunt of requirements in the early stages of Desert Shield and Desert Storm...I am not certain the American public knows and appreciates just how significant a role...our cargo carriers played in the war.[6]

There is every indication that airlift will continue to be most

critical to logistics and sustainment. But consider this:

> In absolute terms and relative to other major modes of transportation, **the ability of our air mobility assets to meet CINC requirements is deteriorating.**[7]

While airlift assets for sustainment support are generally not under the operational control of the theater CINC, there is a role that he can and should play in order to ensure that sufficient support will be available. Lieutenant General Pagonis includes the following in his definition of operational logistics: "Logistics determines how, when, and where the force arrives in theater..."[8] Its operational sustainment corollary could then be stated as: "Operational sustainment determines how, when, and where sustainment support arrives in the theater." Certainly one aspect of "how" is airlift and that makes it a prime consideration for the operational logistician. In view of the deteriorating nature of airlift capability, some air sustainment options available to the operational commander are discussed.

"Logistics planners tend to focus efforts primarily on the deployment problem at the expense of the later phases of the campaign. Detailed logistics planning for employment is equally important."[9] **Joint Pub 4-0** makes clear that deployment and employment phases often run concurrently. Operational logistics plans thus need to include the full spectrum of sustainment needs for all operational phases. Sustainment planning, as well as logistic command and logistic control are briefly discussed in Chapter III.

Chapter IV concludes the examination of air sustainment of military operations and offers some topics for continued study.

CHAPTER II

HIGH PRIORITY MATERIAL MOVEMENT

> During Desert Shield and Desert Storm...a higher percentage of the spare parts were transported by air than in previous wars.[10]
>
> - LT GEN Jimmy Douglas Ross, USA

This chapter will examine the scope of the high priority material needs of military operations using lessons learned from Operations Desert Shield and Desert Storm. The relation of high priority material to air transport and why the trend towards reliance on airlift identified by Lieutenant General Ross can be expected to increase in the future are addressed as are flexible airlift options available to the operational commander.

What is High Priority Cargo?

Short of a prolonged discussion of the Department of Defense Uniform Material Movement and Issue Priority System (UMMIPS), high priority items are emergency material requirements for repair of weapons platforms, weapons themselves, and equipment. They are for immediate use without which an activity would be unable to perform a primary operational mission. Material covered by this definition includes urgently required major components (e.g., aircraft engines), repair parts, and the consumables most critically required by operating forces to maintain high operational readiness. CASREP, NMCS/PMCS, and MICAP[11] are some common service acronyms used to identify these items as high priority.

High priority cargo also includes maintenance work stoppage items that are anticipated to fail in the immediate future that would impair a primary or auxiliary operational mission area.

Consumable supplies can also be designated high priority if lack of the item affects an activity's operational mission. Medical supplies often fall in this category. Pharmaceuticals and other short-lived and perishable items may also qualify for airlift. Importantly, these broad categories of material include a very wide variety of items. Generally speaking, "high priority" not only qualifies, but designates the cargo for air transport.[12] In terms of both piece, weight and cube considerations, as well as the sheer number of material requisitions submitted, it can be an enormous amount of material.

Finally and for purposes of clarity, high priority cargo, by its nature, is material for an immediate need that has already been determined to be not readily available.[13] This means that support from in-theater sources has been exhausted, thus generating a material requirement to a source outside the theater or operational area. When the requirement is large enough and encompasses numerous units, the operational commander must play a role.

Desert Shield/Desert Storm High Priority Material

Just how enormous was the Desert Shield/Desert Storm high priority requirement? Figure 1,[14] by way of illustration, lists Issue Priority Group (IPG) I requisitions submitted to out-theater supply points for a four week period. Because of the wide variety of items included in these requirements, it is difficult to estimate total piece, weight, and cube. However, because each is an IPG I requisition, each qualifies for airlift. The number is staggering. It is therefore essential for the operational commander to understand both material and lift requirements of this magnitude, as well as the time

Figure 1

DESERT SHIELD / DESERT STORM MATERIAL REQUIREMENTS

29 December 1990 - 23 January 1991

	IPG I REQNS	% IPG I	TOTAL REQNS
Navy	36,480	29	126,348
Marine Corps	15,825	48	33,281
Army	189,429	56	336,780
Air Force	79,921	91	87,918
		Total	584,317

Source: COMNAVSUPSYSCOM Logistics Lessons Learned

necessary to move the material, when planning for the next war. Figure 2[15] provides a view of the transportation pipeline.

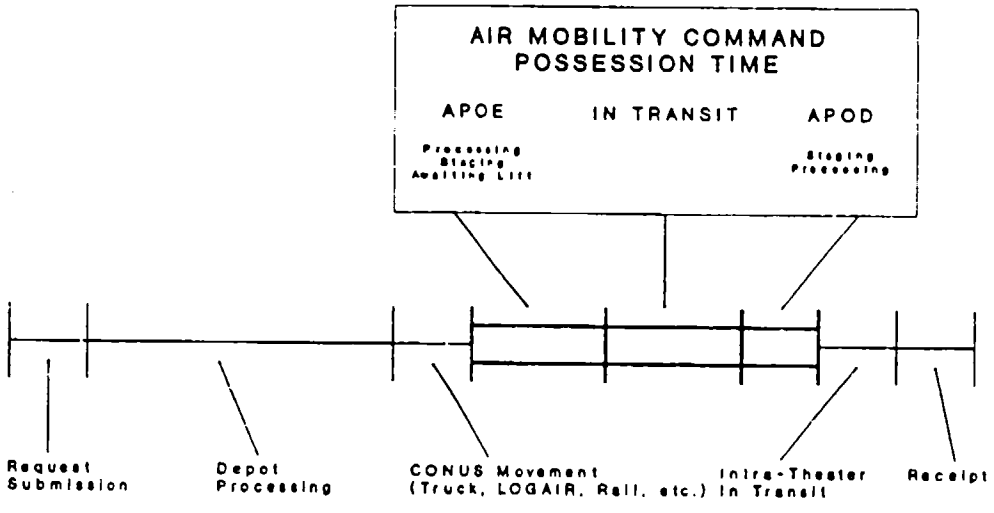
The Future Sustainment Challenge

Material requirements for the next major regional contingency can expect to be at least comparable to Desert Shield/Desert Storm and may likely increase. Reasons include:

- As a result of base closings, fewer forward bases carrying supplies and maintenance equipment to support forward deployed forces.
- Less inventory - another result of downsizing. "DOD has reduced $13.7 billion of inventory from its shelves. By 1997, we project the current $85 billion inventory will be down to $55 billion (in constant 1990 dollars) - a 46 percent reduction from the 1990 baseline of $101 billion."[16]

Figure 2

UMMIPS TRANSPORTATION PIPELINE



- Lack of funding for prepositioned war reserve (PWR) material.[17]
- Fewer air transportation assets.

With fewer forward bases, a greater percentage of material must be transported from the continental United States (CONUS). Similarly, less inventory and fewer war reserve assets at both the unit and supporting base level will require greater reliance on transportation from CONUS while longer waits for the material may push otherwise routine requirements into the high priority area. Finally, with a decline in the number of airlift assets, ostensibly including that portion normally dedicated to sustainment operations, competition increases and wait time further increases, perhaps leading to Eccles' "Logistics Snowball."[18]

Recent efforts increasing sealift and seaborne prepositioning ships will have a mitigating effect. Funding for these programs, however, does not include the equipment and supplies to be prepositioned in these ships.

The problem is not restricted to the next major or lesser regional contingency alone, but extends to support of forces currently deployed and to support for scheduled military exercises throughout the world. Changes in political, diplomatic, and host nation support also effect sustainment planning and operations.[19]

Flexible Airlift Options

In response to the rapid build-up of sustainment supplies at numerous aerial ports of embarkation (APOEs) in CONUS, the Military Airlift Command (MAC - now Air Mobility Command) introduced 'Desert Express.' This was a MAC aircraft dedicated to carry only high priority sustainment material. This section will briefly examine Desert Express, its success, why it should be a standard program for future operations, but also why it may not be enough. In that vein, some other airlift options are reviewed.

Desert Express. With CONUS sustainment APOEs having reached the saturation point and a new requirement to move another 200,000 troops and their equipment to the Gulf, USTRANSCOM established Desert Express in October 1990. The service was designed to be a small package, ultra-high priority, "warstopper" parts, air-express service using a once-a-day MAC aircraft (a second and then a third daily flight were added later). Larger items and those not meeting the warstopper criterion flowed through normal MAC channels.

CENTCOM provided each military service with a daily tonnage allocation and required them to validate each item to qualify it as a valid warstopper.[20] Total material moved was impressive: 3,321 short tons or an estimated 5 million individual pieces of cargo.[21] On the other hand, actual service use was disjointed: Army - 61%, Air Force - 35%, Navy - 3%, Marine Corps - 2%.

Why the inequity? The problem was both structural and qualitative. In the former case, Desert Express flights originated from Charleston (South Carolina) AFB while the Navy/Marine Corps sole sustainment APOE was at Norfolk, Virginia. No established movement channel existed between Norfolk and Charleston and, as it turned out when one was eventually setup, Navy and Marine Corps warstopper parts actually moved faster via the regular MAC sustainment channel from Norfolk.[22] Further, the Desert Express APOD was at Dharan - a good place for the Army and Air Force users, but not the Navy and Marine Corps whose primary Forward Logistic Support Sites (FLSS) were at Manama, Bahrain and Fujairah in the United Arab Emirates, thus requiring additional intra-theater airlift for which assets were also stretched to the limit. The qualitative problem and a chief Navy complaint, was that the other services were disproportionately assigning IPG I to their requisitions to qualify for a greater share of Desert Express capacity.[23] Service use of IPG I in Figure 1, at least, infers as much.

The program certainly must be viewed as an overall success and so should be standardized for use in future operations, hopefully with a more encompassing capability. But Desert Express did little to alleviate the severe backlogs for other essential, high priority material. Sustainment APOE backlogs at

Travis AFB and NAS Norfolk passed 2,000 tons per day and at the Dover AFB APOE reached a daily maximum of 3,400 tons, actually exceeding the total tonnage moved by Desert Express.[24] Other options, used in concert with a USTRANSCOM express program, are needed.

Other Air Mobility Command (AMC) Programs. We have already seen that military airlift capability is deteriorating. Even with the addition of Desert Express to the air sustainment effort, overall air sustainment missions were reduced to meet Desert Shield deployment requirements.[25] Given the near term, and well-known, maintenance and engineering problems of AMC's fleet of C-141s and C-5s, as well as uncertain long term prospects for these aging aircraft,[26] AMC support for large-scale sustainment operations appears insufficient. With regard to the C-17, General Powell testified before Congress:

> Without the C-17, we will have insufficient airlift to carry out the objectives of the *National Military Strategy*.[27]

Notwithstanding this injunction, the C-17 program, currently limited to procurement of just 40 aircraft, offers little hope.[28] However, two established AMC programs provide support for normal peacetime and contingency operations. The first is Channel Airlift. Theater CINCs establish the channel origin and destination points. There are currently over 900 channels operating into some 80 countries. The second program is SAAM, or Special Assignment Airlift Missions, that satisfy special requirements for off-channel movement. AMC's air charter service, in other words.[29] CINCs provide USTRANSCOM/AMC with their forecasted requirements and, as can be seen from the extensive use, are attractive for short duration operations and

exercises or for limited cargo. On the downside, total flights are constrained by increasingly limited flying hour program funding. Also, since JCS retains airlift priority assignment, CINC options may be limited by competition with other theaters.

Commercial Alternatives. Federal Express has been long proposed as an alternative to military airlift. In the small package arena in which it specializes, Federal Express and its commercial competitors would appear, in fact, to be more cost effective and would serve to free up AMC assets for other missions.[30] A related, but largely unexplored option involves scheduled passenger airliners. Newer transports with larger belly-holds have the potential for significant freight capacity and, being subsidized by their passenger carrying operations, offer cut-rate prices.[31]

Both options have been tried: Exercise North Star 89[32] by the Navy and more recently by Army units operating under United Nations Command in the Sinai. Both recognized the merits of the programs, but were frustrated by customs problems. Packages were held in host nation customs for up to eight days. There may, as well, be other problems such as the commercial Title XIII war risk flight insurance debacle experienced by Civil Reserve Air Fleet (CRAF) carriers during Desert Shield/Desert Storm.[33] Here, however, the CINC has considerable sway. Logistics staffs have the authority and wherewithal to establish commercial cargo channels now and to plan for their expanded use for larger contingencies. CINC staffs should explore a resolution to host nation customs problems, perhaps in concert with U.S. Embassy staffs.

CHAPTER III

AIR SUSTAINMENT COMMAND, CONTROL, AND PLANNING

> Many of our most important unresolved problems are logistical...and there are still serious deficiencies in our logistic plans and capabilities. If we fail to correct these deficiencies, they may easily cause our defeat should we have to fight another global war...Some of our present deficiencies are caused by our failure to properly apply what we already know...[34]
>
> - RADM Henry E. Eccles, USN(Ret)

Written in 1953 and itself a lesson learned from World War II, the above quote from Eccles is surprisingly pertinent today. At least one activity has noted that many of the logistics problems encountered during Desert Shield and Desert Storm, in fact, recur in "exercise after exercise, operation after operation. We need to correct the problems...next time we may not have six months to prepare to fight."[35]

Many of the problems that have a bearing on future air sustainment are happening at the national level, seemingly beyond the reach of operational and strategic military planners alike. Operational commanders, however, have tools they can employ to set up effective sustainment operations. This chapter will look at sustainment planning and control. Included is a discussion of the means by which the operational commander can identify and plan for sustainment and so attempt to deal with the challenges discussed in Chapter II.

CINC Responsibilities

Air sustainment, like logistics as a whole, is clearly in the realm of the operational commander's responsibilities. Briefly stated, operational commanders are authorized directive

authority over logistics operations to ensure execution of operation plans (OPLANs), afford efficiency and economy to operations, and coordinate responsibilities and support for and among his components commanders.[36] As well, he should be obligated to provide for an appropriate flow and volume of logistic support.[37]

For large operations such as Desert Shield/Desert Storm, this can be an immense task. In recognition of the complexity of the chore, General Schwarzkopf moved to separate the long-range logistic planning functions of his J-4 staff from the operations that support day-to-day combat operations. He created a USCENTCOM logistic kingpin in Lieutenant General 'Gus' Pagonis while keeping both functions under his single, unified command.[38] This unique move, very successful in providing necessary supplies and services to the combat effort, nevertheless generated considerable confusion as to the chain of command. Pagonis had access and reporting responsibilities to both Schwarzkopf and to Major General Dane Starling, USA, Schwarzkopf's J-4, as well as to USFORSCOM, Pagonis' parent command back in the states. In addition, Pagonis' logistics responsibilities included only United States forces on the ground, but did not include CENTCOM Naval forces or extend to theater ports of debarkation, further adding to the confusion of who was in charge.[39]

Implementing a solution to the lack of a simplified command structure, given Pagonis' success, would make a separate operational level logistics commander an attractive option with obvious and considerable benefits for future operations. Pagonis proposes a ground component single point of contact for

logistic resources and contracting.[40] This should, rather, be extended to a single logistic component commander whose responsibilities include joint, total force logistic support.

Air Sustainment Control

This section will discuss two aspects to the control of air sustainment operations - material tracking, or controlling the flow of material, and overall control of the function of air sustainment resources.

High Priority Material Tracking. During Desert Shield / Desert Storm, the major issue was not one of airlift availability, but of keeping track of the material. There were serious problems in airlift availability to be sure, some already discussed and some to be discussed further on. But most material moved, if not as expeditiously as desired, then eventually. The bigger problem was in the ability to label and trace the material so that it got to the right place in the shortest possible amount of time.

> In 1811, during the Peninsular Campaign, the Duke of Wellington said, "It is very necessary to attend to detail, and to trace a biscuit from Lisbon into a man's mouth on the frontier, and to provide for its movement from place to place, by land and by water, or no military operations can be carried on." What we found during Desert Shield and Desert Storm is that we could move it but couldn't trace it.[41]

Time, the critical element in movement of high priority material, was lost and material piled up awaiting processing at both ends of the pipeline (CONUS and in the CINCCENT theater). There are DOD and service efforts underway to improve traceability of material, principally through barcoding and inter-service compatible computer/information nets. However, logistics planners should recognize that the potentially large

volumes of material, the like of which was seen during Desert Shield/Desert Storm, can quickly overwhelm the best information systems. Logistic plans should therefore include adequate personnel and facility resources at all junctures of the pipeline (refer again to Figure 2).

Functional Control of Sustainment Resources. "The operational commander should have the same control of the logistic resources allocated as he does the combat forces allocated."[42] It is perhaps unfortunate that he always doesn't. In the realm of high priority material sustainment needs he must rely principally on the U. S. Transportation Command (USTRANSCOM) and its air element, Air Mobility Command (AMC) to provide sufficient assets to move material to the operational theater. The operational commander must also rely on the individual services to provide the material itself. Nevertheless, he can exercise his control over the process of high priority movement by ensuring OPLANs and associated logistic and sustainment plans are adequate to the task.

Air Sustainment Planning

Chapter I began with some comments from the Logistic Lessons Learned, including problems with the Joint Operation Planning and Execution System (JOPES), Time Phased Force Deployment Documents (TPFDDs), and the World Wide Military Command and Control System (WWMCCS) - the computer system that contains these programs. The purpose of this section is not to define or discuss the process. Such is covered in various joint publications.[43] Rather it is to review some of the lessons learned and identify common problems that may have a bearing on future plans.

Figure 3

AIR SUSTAINMENT PLANNING PROBLEMS

Desert Shield / Desert Storm Lessons Learned

JOPES	TPFDD
- Inaccurate Airlift Schedules.	- Sustainment Cargo Understated.
- Joint Pub 4-0 & 4-06 Doctrine Ignored.	- LOGAIR Assets Not Scheduled.
- Ad Hoc Procedures Used Vice JOPES	- No Pre-Planned APOE/APOD Channels.
- Cargo Manifests Only 26% Accurate.	- Joint Transportation Board Not Used For Prioritizing Sustainment Cargo.
- JOPES/WWMCCS Not Updated With Mission/Lift Data.	- No Cargo Data Standards.
	- No Cargo Reporting Standards.

Two sustainment problems mentioned repeatedly were inaccurate information in JOPES/WWMCCS and inadequate TPFDDs. Figure 3[44] provides a summary. Each can be summarized as a lack of effective planning and an overall inability to ensure that JOPES/WWMCCS and TPFDDs contained accurate data. Many units either failed to include or severely underestimated their sustainment needs. The immediate consequence was a lack of sufficient airlift for sustainment needs and, later, an inability to accurately estimate sustainment needs even after the problem was identified. USCENTCOM and USTRANSCOM were in a continuous mode of reacting to the shipment requirements of vast amounts of material building up at sustainment APOEs.

OPLANs/LOGPLANs didn't account for LOGAIR support for intra-CONUS movement of air sustainment cargo (or even for truck/rail movement of routine material) to POEs.[45] Finally, USCINCCENT's attempts at gaining control of the situation were frustrated by the lack of accurate data in, and timely updates to, JOPES/WWMCCS.[46]

Operational commanders and their logistics staffs should now have sufficient data from these experiences to 'police' the units expected to deploy in support of their operations. The CINC must ensure that effective sustainment planning estimates are included and that once having moved to the deployment - employment phase, the databases are continuously updated. In addition to planning deployment APOEs and APODs, sustainment APOEs and APODs must be included in plans along with sufficient lift estimates for USTRANSCOM/AMC to plan and provide for airlift assets.

The CINC, in other words, should be a 'player' in material and transportation planning at both ends of the pipeline. His tools to accomplish this planning are JOPES/WWMCCS and the TPFDDs.

CHAPTER IV

CONCLUSION

> If rapid deployment prevented Saddam Hussein from moving his troops into Saudi Arabia, then **mobility itself can be seen as a deterrent to military aggression.**[47]
>
> - GEN Hansford T, Johnson, CINCUSTRANS

A robust air mobility capability is essential to worldwide projection of power. Desert Shield proved that the U.S. military could rapidly deploy. It remains to be seen whether U.S. forces can both deploy and concurrently engage in early combat operations requiring significant sustainment support.

Lessons Learned Revisited

The operational commander must therefore carefully plan for a variety of alternative sustainment scenarios. Careful planning does not, however, mean over-planning that might obstruct ingenuity. As in all combat operations, new and creative measures to meet novel contingencies often mean the difference between success and failure. At the same time, a wide variety of pre-planned logistics and sustainment options offer the operational commander the flexibility to rapidly employ alternatives as operational dictates warrant and, so avoid the confusion of improvisational systems and ad hoc procedures. His tools to establish these programs are JOPES and the TPFDDs; ensuring both accurately reflect material and lift requirements and include the full spectrum of sustainment needs.

Topics For Further Study

As stated earlier, this paper treats many air sustainment issues in necessarily brief review. Each of the subject areas

addressed are worthy of more extensive coverage with an operational level focus.

Operational level sustainment itself has received little attention in the literature. As Colonel Oberthaler has pointed out, neither 'sustainment' (as opposed to sustainability) nor 'operational sustainment' are currently defined in JCS publications.[48] A practical definition of operational sustainment is clearly needed and should be added to joint and service doctrine.

Room also did not permit a more extensive discussion of command, control, communications, and computers - Logistics C^4. A review of logistics communications and computer system lessons learned and of operational employment and inter-operability of Logistics C^4 systems currently in development would be highly beneficial.

Finally, Eccles' Logistics Principles of War, contained in his landmark work Military Concepts and Philosophy, bear further study concerning their applicability both to recent operations and to future threats. In particular, an understanding of his concepts of the 'Logistic Snowball' (as in the high priority backlog at sustainment APOEs) and the 'Underplan-Overplan' Dilemma[49] (the Desert Express response), in the context of 'Logistic Discipline' briefly discussed in Joint Pub 4-0,[50] have clear applicability to current and future operational planning and logistic employment.

NOTES

1. Adapted from John C. Bogle, **Bogle on Mutual Funds: New Perspectives for the Intelligent Investor** (Burr Ridge IL, Irwin Professional Publishing, 1994), p. v.

2. The Joint Staff, Washington, DC, **Doctrine for Logistic Support of Joint Operations (Joint Pub 4-0) (Test Pub)**, June 1990, p. IV-3.

3. The Joint Chiefs of Staff, Washington, DC, **Department of Defense Dictionary of Military and Associated Terms (Joint Pub 1-02)**, 1 December 1989, p. 228.

4. Notes 4a through 4k are directly from the Joint Universal and Navy Lessons Learned Systems, hereinafter referred to as JULLS/NLLS. Edited without change to original intent or context and listed in order of appearance:

   a. **NLLS** #LL7F0-00028, **"Increase in Parts Support During High Tempo Operations,"** submitted by: PATRON FOUR, 7/12/91.

   b. **NLLS** #LLWE0-02143, **"Repair Parts Transportation,"** submitted by: COMNAVFORJAPAN, 6/14/91.

   c. **JULLS** #31952-58451, **"Service Airlift Allocation Management,"** submitted by: USCINCCENT, 3/19/91.

   d. **JULLS** #02345-63814, **"TRANSCOM Involvement in Deployment Planning and Operations,"** submitted by: Hood AFZF-GL-P, 10/23/90.

   e. **JULLS** #62337-61616, **"JOPES Scheduling and Movement Data,"** submitted by: USCENTCOM CCJ3-PJ, 7/8/91.

   f. **JULLS** #31545-99504, **"JOPES Non-Unit Aerial Ports of Embarkation,"** submitted by: USCINCCENT, 3/15/91.

   g. **JULLS** #12831-41556, **"JOPES Manifesting,"** submitted by: 2D FSSG REAR, 1/27/91.

   h. **JULLS** #21140-18167, **"Accuracy of Unit Cargo Data in WWMCCS,"** submitted by: USAEUR, 2/11/91.

   i. **JULLS** #92052-46428, **"Requirement for Logistics Coordinator,"** submitted by: USCENTCOM, c1991.

   j. **JULLS** #61753-26130, **"Desert Express,"** submitted by: DALO-TSP, 6/17/91.

k. JULLS #10836-97996, **"Inability of DLA to Meet Required Delivery Dates,"** submitted by: FMFLANT, 11/8/90.

5. Katherine Butler, **"Operation Desert Storm: The Logistical Story,"** in Government Executive, Vol. 23, No. 5, May 1991, p. 41. Estimates vary, however, between 12 and 15% of cargo moved to the theater of operations via air; total cargo moved is herein estimated at 3.9 million short tons.

6. Diane K. Morales, Assistant Secretary of Defense for Logistics, **"Reshaping Defense Logistics,"** prepared remarks to the Washington, DC Chapter of the National Defense Transportation Association, Arlington, VA, 18 June 1992, in **Defense Issues**, Vol. 7, No. 37, July 1992, p. 2.

7. General Ronald R. Fogelman, USAF, CINCUSTRANSCOM, **"Defense Transportation In a Changing World,"** prepared statement to the House Appropriations Committee, Defense Subcommittee, 24 March 1993, in **Defense Transportation Journal**, June 1993, p. 14. Emphasis added.

8. William G. Pagonis and Michael D. Krause, Operational Logistics and the Gulf War (Arlington VA: The Institute of Land Warfare, Association of the United States Army, 1992), p. 2, quoted in Colonel David P. Oberthaler, U.S. Army, **"An Introduction to Operational Logistics and Sustainment,"** U. S. Naval War College, Newport RI, unpublished paper.

9. **Joint Pub 4-0**, p. II-1.

10. James Kitfield, **"Lt. Gen. Jimmy Douglas Ross [U.S. Army Deputy Chief of Staff for Logistics]: Delivering the Goods to the Troops,"** in Government Executive, Vol. 23, No. 5, May 1991, p. 54. The article continues: "14 percent [of spare parts were delivered by air] during the recent conflict, as compared to 5 percent during Korea and Vietnam, the remainder in both cases going by sea."

11. CASREP - Casualty Report (USN); NMCS/PMCS - Not Mission Capable Supply/Partial Mission Capable Supply (USN); MICAP - Mission Capability Impaired (USAF).

12. "High Priority" generally equates to Issue Priority Groups (IPG) I and II, requisitions priorities 01 to 08, and transportation priorities (TP) 1 and 2. Certain airlift restrictions apply to such items as hazardous material, large bulk, etc., although these do not in themselves necessarily preclude an item from airlift. For a more detailed discussion of UMMIPS see: Department of the Navy, Office of the Chief of Naval Operations, **Uniform Material Movement and Issue Priority System (UMMIPS) (OPNAVINST 4614.1F)** as well as other DOD and service specific directives regarding requisition and

transportation priority assignments.

13. UMMIPS guidelines for time frames would define "readily available" as in the requesting activity's possession within 24 hours. **Ibid.**

14. Defense Technical Information Center (DTIC), Commander, Naval Supply Systems Command (COMNAVSUPSYSCOM), Washington DC ltr 4000 43MA APR 30 1992, **The Gulf War - Logistics Lessons Learned, "Material Availability Issue #3: UMMIPS Discipline,"** p. II-8.

15. From Captain Dave Shepard, USAF, **"Peacetime Airlift: Job #1, Too!"** in **Defense Transportation Journal**, Vol. 46, No. 5, October 1990, p. 17.

16. Morales, p. 1. In addition, the Navy, for example has initiated a 50% reduction in its retail stock levels - principally that material prepositioned on its ships and at its air stations in direct support of unit level operations. It has also eliminated funding for intermediate level stocks.

17. **JULLS** #10836-97996, "Inability of DLA to Meet Required Delivery Dates," submitted by: FMFLANT, 11/8/90.

18. See Henry E. Eccles, **Military Concepts and Philosophy** (New Brunswick, NJ: Rutgers University Press, 1965), p. 79, 85-86.

19. By way of example, Japan has recently severely restrict air operations at Yokota AB - the primary APOE for air sustainment support of USN/USMC forces in both the USPACOM and USCENTCOM AORs. Michael O. Lavitt, ed., **"Industry Outlook: Good Neighbor Policy,"** in **Aviation Week & Space Technology**, Vol. 139, No. 22, 29 November 1993, p. 15.

20. **JULLS**, #31952-58451, **"Service Airlift Allocation Management,"** submitted by: USCINCCENT, 3/19/91.

21. **JULLS**, #61753-26130, **"Desert Express,"** submitted by: DALO-TSP, 6/17/91. Desert Express was terminated in May 1991.

22. **COMNAVSUPSYSCOM Logistics Lessons Learned, "Transportation Issue #5: Desert Express."** p. II-15.

23. _____, **"Transportation Issue #6: Desert Express and DLA Automated Procedures,"** p. II-16.

24. **JULLS**, #31952-58451, **"Service Airlift Allocation Management,"** submitted by: USCINCCENT, 3/19/91.

25. **NLLS**, #LLWE0-02143, **"Repair Parts Transportation,"** submitted by: COMNAVFORJAPAN, 5/20/92.

26. General Ronald R. Fogelman, USAF, CINCUSTRANSCOM, **"Defense Transportation in a Changing World,"** prepared statement to the Senate Armed Services Committee, 22 April 1993, in **Defense Issues**, Vol. 8, No. 28, June 1993, p. 1.

27. General Colin Powell, USA, Chairman, Joint Chiefs of Staff, **"Budget Woes, World Events Shape Military Strategy, Structure,"** prepared statement to the Senate Armed Services Committee, 1 April 1993, in **Defense Issues**, Vol. 8, No. 13, May 1993, p. 4. Italics in original.

28. Graham Button, ed., **"Follow-Through: McDonnell Douglas Takes Wing,"** in **Forbes**, Vol. 153, No. 1, 3 January 1994 and John D. Morrocco, **"Beyond Desert Storm - Airlift, Intelligence Continue to Pose Problems,"** in **Aviation Week & Space Technology**, Vol. 140, No. 3, 17 January 1994, p. 42-44.

29. Shepard, p. 19-20.

30. Major Thomas C. Thalheim, USAF, **Desert Express: An Analysis on Improved Customer Service**, MS Thesis, AFIT/GLM/LSM/91S-64, School of Systems and Logistics, Air Force Institute of Technology, Wright-Patterson AFB OH, September 1991, p. 113. This study compared MAC ton/mile cost of approximately $1.95 to FEDEX's $ .46, more than a fourfold savings.

31. Paul Proctor, ed., **"Airline Outlook: Absolutely, Positively Not Competition,"** in **Aviation Week & Space Technology**, Vol. 140, No. 1, 3 January 1993, p. 15.

32. **NLLS**, #LLEA0-00583, **"Customs and Immigration Notification Procedures Were Not Established,"** submitted by: CTG 137.2, 10/14/92.

33. Morales, p. 3-4.

34. Eccles, RADM Henry E. (Ret), **"Logistics - What Is It?"** reprinted from **Proceedings (1953)** in **Logistics Spectrum**, Vol. 16, No. 2, Summer 1982, p. 10.

35. **Defense Logistics Studies Information Exchange (DLSIE)**, Study Abstract ID #085893A, **"Air Force Desert Shield / Desert Storm Logistics Lessons Learned,"** submitted by: Commander, Air Force Logistics Management Agency, Gunter AFS AL, March 1992.

36. **Joint Pub 4-0**, p. I-2, I-4.

37. Henry E. Eccles, **Military Concepts and Philosophy**, p. 101.

38. Lt. General William G. Pagonis with Jeffrey L. Cruikshank, **Moving Mountains: Lessons in Leadership and Logistics from the Gulf War** (Boston: Harvard Business School Press, 1992), p.

xiv, 208, 215-16.

39. **Ibid.**, p. 97-8.

40. **Ibid.**, p. 207.

41. Morales, p. 2.

42. Henry E. Eccles, **Military Concepts and Philosophy**, p. 101.

43. For more detailed information on the cargo movement and transportation aspects of JOPES, refer to the following publications:

    a. **Joint Pub 4-0.**

    b. Office of the Chairman, Joint Chiefs of Staff, Washington, DC, **Mobilization Planning (Joint Pub 4-05)**, First Draft, 22 February 1993.

    c. The Joint Chiefs of Staff, Washington, DC, **Proposed Final Pub (JOPES) Joint Operation Planning and Execution System, Volume I, Planning Policies and Procedures (Joint Pub 5-03.1)**.

44. As in Note 4 above. Listed in order of appearance:

    JOPES

    a. **JULLS** #62337-61616, **"JOPES Scheduling and Movement Data,"** submitted by: USCENTCOM CCJ3-PJ, 7/8/91.

    b. **JULLS** #92052-46428, **"Requirement for Logistics Coordinator,"** submitted by: USCENTCOM, c1991.

    c. **JULLS** #21140-18167, **"Accuracy of Unit Cargo Data in WWMCCS,"** submitted by: USAEUR, 2/11/91.

    d. **JULLS** #01634-76750, **"Air Mission Information for Supported CINC,"** submitted by: USFORSCOM FCJ4-POP, 8/15/91.

    TPFDD

    a. **JULLS** #31545-99504, **"JOPES Non-Unit Aerial Ports of Embarkation,"** submitted by: USCINCCENT, 3/15/91.

    b. **Ibid.**

    c. **Ibid.**

    d. **COMNAVSUPSYSCOM Logistics Lessons Learned**,

"Transportation Issue #2: Mobilization and Logistics Procedures Discipline," p. II-12.

e. **JULLS**, #02930-85708, **"Cargo Reporting Data Is Not Standard,"** submitted by: USTRANSCOM TCJ3/J4-JTO, 4/19/91.

f. **NULLS**, #LL7F0-00316, **"In-Theater Pax/Mail/Cargo Routing,"** submitted by: CTF-154, 3/7/91.

45. **JULLS**, #21140-18167, **"Accuracy of Unit Cargo Data in WWMCCS,"** submitted by: USAEUR, 2/11/91.

46. **JULLS**, #62337-61616, **"JOPES Scheduling and Movement Data,"** submitted by: USCENTCOM CCJ3-PJ, 7/8/91.

47. Butler, p. 41.

48. Oberthaler, p. 2.

49. Henry E. Eccles, **Military Concepts and Philosophy**, p. 90-2.

50. **Joint Pub 4-0**, p. IV-7.

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